

The Physics Experiments of Robert Wichard Pohl (1884–1976)

For decades, Robert Wichard Pohl taught his famous lectures of introductory physics in the old lecture hall of the Physics Institute at Goettingen University. These lectures became the foundation for three volumes entitled „Introduction into Physics“. Now, using Professor Pohl's original instruments in the same lecture hall in which he taught, this set of videos captures his extraordinary ingenuity and once more brings to life Pohl's great experimental skills.



Transverse vibrations of a string

Video title: Transverse vibrations of a string

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Abstract: To demonstrate that vibrations of a stretched string are far more complicated than is commonly assumed. On such a string, a large number of higher harmonics of different amplitudes are usually superimposed (which may explain the difficulties for musicians to play a string instrument well). This complexity is also observable in the motion of sections of the string, as will be shown in this experiment.

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Goal of the experiment: To demonstrate that vibrations of a stretched string are far more complicated than is commonly assumed. On such a string, a large number of higher harmonics of different amplitudes are usually superimposed (which may explain the difficulties for musicians to play a string instrument well). This complexity is also observable in the motion of sections of the string, as will be shown in this experiment.

Experimental setup: A violin string is stretched perpendicularly across an optical bench, and can be excited either by plucking, or by striking it with a bow. An arbitrary spot of the string is illuminated through a vertical slit, and is projected on the wall of the lecture hall. The time-dependent motion is displayed by moving the imaging lens sideways. Practically, several lenses are arranged in a circle on a disk which can be rotated manually.

Experiment: The string is plucked, as can be heard. The slit with the vibrating section of the string is shown on the projection screen. As the disk with the lenses is rotated, the time-dependent motion of the section is displayed. It is by no means a simple sinusoidal oscillation. Rather, the pictures show amazingly complicated patterns. Similar patterns are also obtained with a violin bow.

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